REMARKS

Applicants respectfully request reconsideration and allowance of the pending claims.

I. Status of the Claims

Upon entry of this amendment, claims 15-24, 26, 30-35, 42, 43, 45-48, 51-56, 58-60, 64-72, 74-91, 93-97, and 99 remain pending. Claims 42, 47, 48, 68, 70, 72, 74 84, 88, 93, 94, 96, 97, and 99 have been amended.

Claims 42, 68, 70, 72, 74, 84, 88, 96, 97, and 99 have been amended to further clarify the method of the claimed invention. In this regard, each claims requires the delivery of at least two components (at least five components in claim 70) to form at least 10 different materials (at least 100 in claim 72). Support for this concept may be found in the applicants' originally filed specification at page 5, line 29 to page 6, line 7 (at least two components are delivered) and at page 8, lines 28-30 (at least ten different inorganic materials). The at least ten different inorganic materials are prepared by varying the combination of delivered components. The combination may be varied in a several ways, including varying the composition of the components, the concentrations of the components, or the thicknesses of the components among the regions, as described in applicants' specification at page 6, lines 4-8 and as claimed in claims 96, 97, and 99. These concepts are further described at page 18, lines 14-32 and exemplified in, for example, Example D starting at page 71 of the specification. Applicants have deleted from these claims the language directed to composition, concentration, and thickness. Applicants have inserted the requirement that the combination of components varies among the respective regions. Applicants submit that the new language more clearly describes

the intention that the delivered components must be varied in combination among the regions in order to prepare at least ten different inorganic materials. For example, across ten regions, the first component may be the same and may be delivered in the same thicknesses. In order to vary the combination of components across the regions, the second component must vary according to composition, thickness, or concentration, or a combination of these -- this is implicitly required in the claimed method without having to explicitly state "composition, concentration, or thickness." These concepts are described at page 19, line 11 to page 20, line 17, which further supports the method as claimed herein.

The amendments to claims 47 and 48 may be found in the specification at page 20, line 8 through 14; at page 49, line 19 through page 50, line 15; and by claim 93. The amendment to claims 68 and 93 is supported at page 20, line 8 through 14 and claim 48. Claim 94 was amended to correct is claim dependency.

II. Claim Rejections Under 35 U.S.C. §102(b)

Reconsideration is requested of the rejection of claims 15-19, 23, 24, 26, 30-33, 42, 43, 45-49, 51-55, 59, 60, 64-72, 74-78, 80, 82, 83, 88-91, 93, 96, and 99 as being anticipated by Pohm et al., as evidenced by Maxwell et al., Kitada et al., and Mattox.

A. The Claimed Invention

Each of the independent claims requires the delivery of at least two components (at least five components in claim 70) in which the combination of the two components is varied among the regions of an array in order to form at least 10 different inorganic materials (at least 100 in claim 72). Unlike the art cited, e.g., Pohm et al. in particular, applicants' claims are

directed to a method which employs combinatorial chemistry to identify new and useful inorganic materials. In order to prepare at least ten different inorganic materials, certain factors that affect the materials formed by the delivered components may be varied as described in applicants' specification, for example, the composition, concentration, or thickness of the delivered first or second components. Other factors may also be manipulated, such as reaction conditions which affect thermodynamic stability, across the array to form the at least ten different inorganic materials. These claims are directed to methods in which the combination of delivered materials are varied in order to form the at least ten different inorganic materials. Inasmuch as Pohm et al. is directed neither to combinatorial chemistry, nor do they disclose techniques directed to the development of new materials, applicants respectfully request reconsideration of the present rejections based on Pohm et al. as the primary reference. The remarks as set forth below further show that the Pohm et al. reference, alone or in combination with the other art of record, neither anticipate the claims nor render them obvious.

As shown in the background section of applicants' specification in one exemplary system, forming ten different materials by varying the combination of delivered components can require substantial variation in the combination of materials delivered across the array. The variation in the combination of delivered components necessary to achieve the formation of at several different inorganic materials is substantial in inorganic systems since these materials often assume specific, discrete stoichiometries that, in many cases, are not predictable prior to reaction. For example, an array of multiple NiZr binary alloys may be prepared by delivering nickel and zirconium components. As described in the Background

section at page 2, lines 18-23 of the filed application, "Even for the relatively simple intermetallic compounds, such as the binary compounds of nickel and zirconium (Ni_5Zr, Ni_7Zr_2, Ni_3Zr, Ni_2Zr_8, $Ni_{10}Zr_7$, $Ni_{11}Zr_9$, NiZr, and $NiZr_2$), it is not yet understood why ***only*** certain stoichiometries occur." The relative proportions of Ni and Zr in these eight NiZr binary compounds varies substantially:

Alloy	% Nickel in Alloy	% Zirconium in Alloy
Ni_5Zr	83.33%	16.67%
Ni_7Zr_2	77.78%	22.22%
Ni_3Zr	75%	25%
Ni_2Zr_8	20%	80%
$Ni_{10}Zr_7$	58.8%	41.2%
$Ni_{11}Zr_9$	55%	45%
NiZr	50%	50%
$NiZr_2$	33.33%	66.67%

To prepare an array comprising each of the eight different NiZr binary alloys, the relative amounts of nickel delivered to the regions of the array must also vary widely, possibly from about 20% to about 85%. If the relative proportions of Ni and Zr delivered to the respective regions are varied only slightly, only one or two of the NiZr binary alloys might actually be obtained. For example, if 11 different regions received from 15% to 25% Ni wherein the amount of Ni increases from one region to the next in 1% increments, one may end up preparing only the Ni_2Zr_8, which has about 20% nickel, and possibly the $NiZr_2$ alloy, which has about 33% nickel. Accordingly, if the amounts of Ni and Zr delivered to the predefined discrete regions of the substrate varies little from one region to the next, one does not necessarily or inherently end up preparing multiple different NiZr binary alloys on the array. Simply stated, even for a simple binary system, to prepare ***at least ten different inorganic materials*** requires non-trivial, i.e., substantial

variation, in the combination of the delivered components among the regions in the array. Trivial variations do not necessarily or inherently lead to the preparation of at least ten different inorganic materials on the array.

The above description of the binary Ni and Zr system exemplifies the variation required to prepare several different NiZr binary alloys. While illustrative, it is not meant to be limiting. In other systems, it may be possible to prepare at least ten different inorganic materials from less extensive variations in the combinations of delivered components among the regions in the array. The extent of variation required for preparing at least ten different inorganic materials is therefore based on the identity of the components, the thermodynamics of the final product, and the reaction conditions. Whatever the system, the variation must be substantial, i.e., non-trivial, enough to effect preparation of at least ten different inorganic materials. The claimed method, therefore, does not read on materials delivery systems wherein variation may occur within normal process tolerances that are not substantial enough (i.e., are trivial variations) to achieve the preparation of at least ten different inorganic materials on the array.

B. The Disclosures of Pohm et al. and Declarations of John Reed and Daniel M. Giaquinta

As stated above, applicants claims are directed to a method which employs combinatorial chemistry to identify new and useful inorganic materials. Pohm et al. is directed neither to combinatorial chemistry, nor do they disclose techniques directed to the development of new materials. Pohm et al. describe a method for preparing an experimental array of word line strips on a 2" by 2" glass substrate. The arrays are

wrapped with five-turn digit lines. As shown in FIG. 2, on page 409, the array is divided into multiple sections, and in each section, word line strips are deposited to varying widths, such as 1 mil, 2 mil, 3 mil, and 4 mil. Moreover, the spacing between each word line in each section is varied, such as 3 mil, 4 mil, 5 mil, and 6 mil, respectively. Varying the widths and the spacing of the word lines allows testing of different sized storage cells.

The method for preparing the word line strips involves the vapor deposition of 5 separate materials, according to the following steps:

(1) Vapor depositing a thin layer of chromium to a thickness between 100 and 300 Angstroms at a temperature of 150°C onto the glass substrate. The chromium is deposited to enhance adhesion between the glass substrate and the next deposited Permalloy layer.

(2) Vapor depositing a layer of Ni-Fe Permalloy onto the chromium layer to a thickness between 1000 and 1500 angstroms at a temperature of 150°C.

(3) Vapor depositing a layer of copper onto the Permalloy layer to a thickness between 5000 and 1500 angstroms at a temperature of 150°C.

(4) Vapor depositing a layer of titanium onto the copper layer to a thickness between 200 and 400 angstroms at a temperature of 150°C. Titanium is deposited to reduce the effects of the rough copper layer on the second Permalloy layer

(5) Vapor depositing a layer of Ni-Fe Permalloy onto the titanium layer to a thickness between 1000 and 1500 angstroms at a temperature of 150°C.

As recognized by Declarant Daniel M. Giaquinta, filed with Amendment K, the order of deposition and the compositions of the word lines are features that Pohm et al. do not vary:

8) Table I of Pohm does not allow for any layer to be in any order (see p. 409, par. 3). Each layer has been deposited to perform a specific task; if a layer were to be omitted, the goal of demonstrating a "very high density DRO magnetic film memory array" (p. 408, par. 1, ln 5-6) may be unrealized. If a layer is deposited too thinly, for example, the function of the layer may be unfulfilled. If a layer is deposited more thickly, however, the device would still function in the same manner, although perhaps less efficiently. The Cr layer, for example, is a buffer layer between the layer-2 ferromagnet and the glass (p. 409, par. 3, ln 1-2). According to Pohm, the purpose of the Cr layer is to "increase adhesion between the glass substrate and the first permalloy layer and to increase the coercive force of the first permalloy layer." In my opinion, that if Cr were another composition the explicit purpose of the Cr layer deposition may be unattainable. Layer 2 is a specific composition (permalloy: 81.5 mol% Ni and 18.5mol% Fe) with specific magnetic characteristics. I believe it cannot be implied that Pohm would intentionally vary the composition of the ferromagnet in his magnetic storage device. Continuing, Layer 3 is copper, explicitly chosen for its high conductivity. As previously, in my opinion it would not be likely that the Cu layer would be modified to another composition, especially due to the fact that Pohm noted that the substrate temperature was kept to a minimum to avoid Cu diffusion (p. 409, par. 3, ln 11-13). The purpose of layer-4 Ti is also explicitly defined by Pohm (p.409, par. 3, ln 9-11). While multiple storage cell structures were prepared (p. 409, par. 2, ln 1), the role of each layer remained the same indicating that any layer or a random layer order would not be feasible.

9) In my opinion, Table I in Pohm discloses that only the same components and the same materials are made in each cell and that the ranges in Table I (e.g., 100-300 Cr) are not compositional ranges for different regions of the wafer. The only difference between the regions of Pohm are the physical size of the regions, which is a result of the different spacings in both the word and digit line directions to create "different sized storage cells (see

> bottom of second column of page 408 in the sentence that carries over to page 409). As a result, the materials in each region of Pohm are not different on the basis of the composition, concentration or thickness of the delivered (e.g., first or second) component, as required by the claims.

Moreover, as stated in the Declaration of John A. Reed submitted with Amendment K, the thicknesses of the various layers are also not varied across the patterned dice, but if they do vary, the thicknesses of the deposited layers vary only with the range of normal process tolerances:

> 7) It is important to note that Pohm's article proposes building a plurality of ***identically patterned dice***, each with the variety of geometries discussed in the prior paragraph, on a single wafer. (See Pohm Figure Ia) Each die of the plurality of dice contained on each processed wafer, ***would have identical film thickness parameters, at least within the range of normal processing tolerances***. Thus, to set film thickness parameters at some certain values and process wafers with techniques available to Pohm in 1969, each die on any given wafer would have ***virtually identical film thickness characteristics;*** in order to obtain experimental test devices with differing film thickness would require processing separate wafers differently (i.e., by varying deposition times) to obtain the different results.

As recognized by Declarants Giaquinta and Reed, Pohm et al.'s die patterning process delivers components of a word line strip in a strict order of deposition to the die at thicknesses that are nearly identical across the entire wafer or die, with the understanding that that material delivery may vary slightly, i.e., within the range of "normal processing tolerances."

C. The Present Anticipation Rejection

In view of Applicants' Amendment K, which established that Pohm et al. deposit identical word line strips across the patterned die wherein the only variation is within the range of normal process tolerances, the Office has withdrawn the previous rejection, but has entered a new anticipation rejection based on all of the previously cited art and further supported by Mattox. The Office asserts:

> In addition, although Pohm et al. do not expressly state that they are varying the composition, concentration, or thickness of the delivered first and second components between respective regions, it is respectfully submitted that Pohm et al. inherently discloses this feature as evidenced by Mattox. For example, Mattox discloses that a vapor deposition process like the one disclosed in Pohm et al. will result in a cosine distribution of materials on the substrate (e.g., see Pohm et al., figure 4). A point directly across from the source (zero degrees) will acquire more material (i.e., result in a thicker layer) than a point located farther away (e.g., 30 degrees). ... Thus, it is clear from Mattox that Pohm is distributing uneven layers of materials onto the substrate based at least in part on this relationship between the distribution rate and the angle of incidence...

Mattox theorizes on page 399 that a single point source vapor deposits material on a plane according to a cosine distribution, wherein more material is deposited at the point nearest the source (angle = 0°) and less material is deposited as the angle of incidence increases. Mattox shows that the amount deposited at angle of incidence 15° is 0.83 (about 83%) of the amount deposited at angle of incidence 0°.

The Office cites this as evidence that Pohm et al.'s deposition method results in non-uniform distribution of their materials. In the Office's view, the composition,

concentration, or thickness of the delivered first and second components is varied among the regions in the substrate.

Applicants respectfully submit that Pohm et al. as evidenced by Mattox do not anticipate the independent claims. In order to anticipate the claims, the asserted cosine distribution problem must be substantial enough to cause variation in the delivered first and second components to be sufficient to prepare at least ten different inorganic materials. Applicants' method is novel over the Pohm et al. reference since (1) variations with normal processing tolerances in Pohm et al.'s process would not necessarily or inherently be sufficient to achieve an array preparation method which prepares at least ten different inorganic materials for the reasons stated in the Declarations of Giaquinta and Reed submitted with Amendment K, and (2) the Pohm et al. authors employed corrective measures to ensure preparation of substantially identically patterned dice.

While Mattox discloses a theory that vapor deposited material deposits according to a cosine distribution method, Mattox states the actual deposition of material under empirical conditions may deviate substantially from such a simple model:

> In actuality, ***the flux distribution from the source may not be cosine*** but can be modified by source geometry, collisions from the vapor above the vaporizing surface when there is a high vaporization rate, level of evaporant in the sources, changes in vaporization source geometry with time, etc." See page 398, second fully paragraph of Mattox.

In view thereof, vapor deposition from a point source does not necessarily yield a perfect cosine distribution, but rather factors such as source geometry changes may be employed to smooth the deposit material and make it more uniform.

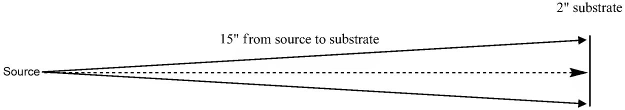
Mattox even discloses corrective measures to reduce the cosine distribution problem:

> The strong dependence of deposition rate on geometry and time ***often requires that fixturing and tooling be used to randomize the substrate(s) position*** during deposition in order to increase the film thickness uniformity. This fixturing also randomizes the angle of incidence of the depositing vapor flux, ***thereby increasing the uniformity of the film properties over the substrate(s) surface***. Page 398, third full paragraph.

In the context of vapor deposition, therefore, the ordinarily skilled person is well aware of the potential for uneven deposition and therefore would have known to take steps to prevent it.

The authors of the Pohm et al. reference were also aware of the potential cosine distribution problem and actually took steps to reduce the angle of incidence effects. See Col. 2, page 408: "To ***reduce angle of incidence*** effects, the substrates were placed about 15 inches directly above the source. A quartz crystal thickness monitor was installed to control the evaporation rates and to determine the film thickness."

Pohm et al.'s placement of the 2" by 2" glass substrates 15 inches from the source would have been sufficient to ensure that the variation in the thickness of the material deposited would have been extremely small, and likely trivial enough to ensure uniform deposition of substantially identical materials in all regions across the array. The distance from the source to the glass substrate may be shown geometrically by the figure below:



The source is thus relatively far away from the glass substrate. The angle of incidence from the source to the point on the substrate indicated by the broken arrow is 0°. The angle of incidence, θ, from the source to the two points on the substrate indicated by the continuous arrows, i.e., the edges of the substrate, can be calculated according to the equation

$$\tan(\theta) = 1''/15''$$

$$\theta = 3.8°$$

The hypotenuse of the triangle formed these two continuous arrows is 15.033" (calculated according to the Pythagorean theorem). Since the substrate is flat, the angle from the point of incidence toward the source, φ, is also 3.8°. The equation on the top of page 399 of Mattox may be used to determine the relative amount of material that will be deposited at an angle of incidence of 3.8°:

$$\text{Fraction of material Deposited at edge of substrate} = \frac{[\cos(3.8)*\cos(3.8)]/(15.033)^2}{[\cos(0)*\cos(0)]/(15)^2}$$

$$= 0.991$$

The fraction of material deposited at the edge (1 inch from the center) of the substrate is 99.1% of the amount deposited at an angle of incidence of 0°. In other words, the thickness variation from the very edge of the glass substrate compared to the center of the substrate is at most about 0.9%, but the thickness variation from one word line strip to the adjacent word line strip is substantially less. Pohm et al. separate their word line strips by as much as 6 mil, which is only 0.006 inches. If the variation in thickness across the one inch separation from the edge of the glass substrate to the center is less than 1%, the variation between each line would be expected

to be a fraction of that, on the order of 0.005% between each line, which is so trivial that, within the range of normal process tolerance, the materials in adjacent regions are identical. The variations would be even more insignificant for word lines spaced more closely, such as 5 mil, 4 mil, or even 3 mil apart. Moreover, since Mattox states that the flux distribution is affected by factors (e.g., collisions from the vapor above the vaporizing surface when there is a high vaporization rate, level of evaporant in the sources, changes in vaporization source geometry with time) that would cause the variation to deviate from the perfect cosine distribution model, the variations may be still more insignificant, if they even exist at all, between word lines that are so closely spaced.

Accordingly, even if Pohm et al.'s deposition method yielded slight variance (on the order of 0.005% or less from one word line to another and on the order of 0.9% across the entire substrate) in the amount of material deposited among the word line strips, the differences are clearly trivial and would not necessarily or inherently accomplish the requirement that the method form "at least ten of the materials being different from each other..."

Inasmuch as Pohm et al. disclose a process for depositing identical components in a rigid order to each region of a patterned dice and the only variation that may occur is within the range of normal process tolerances, applicants respectfully submit that Pohm et al. do not disclose a method whereby the combination of delivered components among regions are varied to a degree sufficient to form ten or more different inorganic materials on ten or more predefined discrete regions of a rigid substrate. In view thereof, Pohm et al. as evidenced by Mattox do not anticipate the methods as defined by the independent

claims, and applicants respectfully request that the rejections be withdrawn.

Claims 15-19, 23, 24, 26, 30-33, 43, 45-49, 51-55, 59, 60, 64-67, 69, 71, 74-78, 80, 82, 83, 89-91, 93, 96, and 99 depend from independent claims 42, 68, 70, 72, 74, and 88.

Claims 46-48, 68, 77, and 93, among others, require the delivered components to interact, such as by intermingling, interdiffusing interspersing, doping, implanting, interpenetrating, condensing or fusing. The components may be made to interact by annealing between 200°C and 300°C. Pohm et al. do not disclose this step. Pohm et al. are explicitly directed to a method of preparing dice with multiple word line strips, each word line strip prepared by depositing a series of materials. These materials are not meant to interact, by annealing at temperatures between 200°C and 300°C or otherwise. In fact, the materials that make up the word line strips must remain separate and distinct layers in order for the word line to properly carry out its function of conducting electrical signals. It is crucially important to Pohm et al.'s memory array to avoid the formation of metal alloys and intermetallics in the copper wire line and the Permalloy film in particular. If the copper line became contaminated with the surrounding Permalloy or titanium, its conducting properties would become degraded. If the Permalloy became contaminated with copper, its magnetic properties may become degraded. As shown by Kitada et al., at page 175, the magnetic properties of Permalloy become degraded by reaction with copper at temperatures as low as 250°C. In view of this, Pohm et al. would have explicitly avoided interactions between layers. In fact, Pohm et al. affirmatively avoided such interactions by depositing their materials at lower than normal temperatures. See Col. 1, page 409 of Pohm et al., "To keep copper recrystallization and

diffusion to a tolerable level, deposition temperature was kept lower than usual." Pohm et al. do not disclose any other process steps, such as low temperature annealing, after the word line strips were deposited that would have caused the deposited materials to interact.

III. Claim Rejections Under 35 U.S.C. §103(a)

Reconsideration is requested of the rejection of claims 15-24, 26, 30-35, 42, 43, 45-48, 51-56, 58-60, 64-72, 74-91, 93, 95, 96, and 99 as being obvious over Pohm et al. in view of Howard et al., Makino et al., Lee, Brown et al., and Jubb et al., as evidenced by Maxwell et al. and Kitada et al.

Applicants respectfully submit that the claims are non-obvious over the cited references for substantially the same reasons that they are not anticipated by these references and for the additional reasons that neither the references nor the level of skill in the art nor the nature of the problem to which Pohm et al. is addressed would have provided the ordinarily skilled person with any reason to modify Pohm et al. or any of the other references to arrive at a method of preparing an array of inorganic materials whereby the combination of delivered components is varied between respective regions to a degree sufficient to form ten or more different inorganic materials on ten or more predefined discrete regions of a rigid substrate. Applicants' claims are directed to a method of applying combinatorial techniques for the discovery of new inorganic materials. Hence, the claims require varying the combination of components among regions in order to prepare at least ten different inorganic materials across the array.

As a general matter, none of the references cited herein are directed to applying combinatorial techniques to the discovery of at least ten different inorganic materials.

Rather, each and every reference is generally directed to methods of depositing circuitry patterns on different types of substrates. Preparing new inorganic materials is not a goal of any of the references, and in fact, since the circuitry patterns are tested for such factors as signal propagation, failure rate, resistivity, etc., the ordinarily skilled person would have understood that the authors of each reference would have taken measures to ensure that the features have uniform compositions in each region of the substrate in order to carry out valid experimental testing.

In the context of determining obviousness under 35 U.S.C. §103(a), the Supreme Court in *KSR* reaffirmed the familiar framework for determining obviousness as set forth in *Graham v. John Deere Co.* (383 U.S. 1, 148 USPQ 459 (1966)). See MPEP §2141. Within that framework, the Office must determine obviousness based upon underlying factual inquiries, including:

> (A) Determining the scope and contents of the prior art; and
> (B) Ascertaining the differences between the prior art and the claims in issue.

Once the scope and contents of the prior art are determined, and the differences between the art and claims at issue are ascertained, it is next incumbent upon the Office to provide a reason why the claims are obvious, as required by *KSR International Co. v. Teleflex Inc.* and endorsed by MPEP §2142:

> The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1396 (2007) noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead,

> ***there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.***" *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). See also *KSR,* 550 U.S. at ___ , 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval).

The disclosure of the cited Pohm et al. reference is provided above in connection with the anticipation rejection. Pohm et al. would not have provided the ordinarily skilled person with any reason to modify their method of preparing an array of word line strips to arrive at a method of preparing an array of inorganic materials whereby the combination of components is varied among respective regions to a degree sufficient to form ten or more different inorganic materials on ten or more predefined discrete regions of a rigid substrate. For the reasons stated above, Pohm et al. do not vary delivered components between respective regions, in terms of concentration or composition, except for trivial differences that may arise within the range of normal process tolerances. While trivial differences may arise in the context of Pohm et al.'s deposition method, these differences are kept to a minimum since Pohm et al. explicitly state that they take corrective measures to reduce angle of incidence effects. Moreover, differences in deposition rates that are within the range of normal process tolerances are trivial and thus would not result in the preparation of at least ten different inorganic materials across the array. The ordinarily skilled person would also have understood that Pohm et al. are not applying combinatorial methods for preparing at least ten different inorganic materials. Pohm et al. do not disclose anywhere in their specification that such a goal is a purpose of their array preparation method. Rather, Pohm et al. are directed to preparing a series of word line strips of varying widths in

order to test for such factors as propagation delay, failure rate, and signal level. These factors are in no way related to preparing new inorganic materials, such that the ordinarily skilled person would not have found any reason to even consider Pohm et al. for guidance in preparing different inorganic materials by the combinatorial technique disclosed in the present application.

Howard et al. describe a method for forming aluminum based circuitry in a silicon substrate comprising a silicon dioxide dielectric layer thereon. The aluminum-based circuitry is built within the dielectric layer. Howard et al. test various deposition methods in order to extend the median failure time of the aluminum-based circuitry. In one embodiment, the circuitry is built by depositing 5000 Angstroms of an Al-4% Cu alloy in the dielectric layer, which is followed by deposition of a 500 Angstrom metal or alloy layer, which is followed by deposition of another 5000 Angstroms of an Al-4% Cu alloy. Intermediate metal layers include Ti, Cr, Ni, and Ta. Intermediate alloy layers include $CrAl_7$-Cr, $TiAl_3$-Ti, $TaAl_3$-Ta, and $HfAl_3$-Hf. After deposition, Howard et al. determine the median failure time for each circuitry pattern. Several of their test patterns exhibited median failure times greater than the Al-4% Cu control circuitry pattern. In many ways, Howard et al.'s method is similar to Pohm et al.'s method in that in both references, the goal is to deposit test patterns of a circuitry material and then subject the test patterns to a diagnostic test, which, in Howard et al.'s disclosure, is the median failure time of each circuitry pattern. Like Pohm et al., Howard et al. are not describing applying combinatorial methods for preparing at least ten different inorganic materials. Howard et al. do not disclose anywhere in their specification that such a goal is a purpose of their array preparation method. Rather, Howard et

al., like Pohm et al., are directed to preparing test patterns to test for median failure time. This test is in no way related to preparing new inorganic materials, such that the ordinarily skilled person would not have found any reason to even consider Howard et al. for guidance in preparing different inorganic materials by the combinatorial technique disclosed in the present application.

Makino et al. disclose a method for protecting Permalloy films from corrosion. They deposit a Ni-P coating on a Permalloy film, which was stated to greatly improve the corrosion protection of the film. For further corrosion protection, Makino et al. further coat the film with polyparaxylylen. Since Makino et al.'s method is directed to the deposition of continuous Permalloy films that they additionally coat with continuous films of Ni-P and polyparaxylylen, their disclosure is not even related to depositing components on discrete regions of an array. In view thereof, Makino et al. is further removed from Pohm et al. and Howard et al., which at least disclose depositing multiple samples in discrete regions in a single substrate. Moreover, like Pohm et al. and Howard et al., the ordinarily skilled person would have understood that Makino et al. is not directed to applying combinatorial techniques to the preparation of at least ten different inorganic materials and thus would not have referred to Makino et al. for guidance in carrying out such a method.

Lee et al. disclose a method for preparing a high density coupled magnetic film memory array. The memory array comprises 6400 elements per square inch. Each element is prepared by sequential deposition of thin films of Co, Permalloy film, and copper which cover the entire substrate. The word lines are revealed by etching portions of the film. Next, a thin layer of

dielectric is deposited over the word lines. Then, the entire dielectric layer is covered with copper, which is then etched to reveal the bit lines. Although Lee et al.'s array preparation method employs subtractive etching rather then addition methods, as in Pohm et al., the final device geometry is similar in many ways, since they both contain multilayer word lines and copper digit lines separated by a dielectric. The method claims are non-obvious over Lee et al. for substantially the reasons stated above in connection with Pohm et al. and Howard et al. All three references are similar in that they disclose methods of depositing circuitry patterns on a substrate and then performing a diagnostic test on them. In Lee et al.'s case, they test the elements for resistivity. The ordinarily skilled person would have understood that this reference is not directed to applying combinatorial techniques for the preparation of at least ten different inorganic materials on an array.

Brown et al. disclose a method for fabricating a multilayer chip useful as a storage cell. A vertical cross-section of such a chip is shown in FIG. 8, at Column 2 at page 1504. The Gadolinium Gallium Garnet (GGG) substrate is topped with a boot layer made of PbO/B_2O_3, which was deposited by liquid phase epitaxy (LPE). The boot material is then topped with a continuous $(YSmGdTmCa)_3(GeFe)_5O_{12}$ bubble film which was also deposited by LPE. As shown in FIG. 8, the thickness of the bubble film may vary from 1.6 micrometers to 2.7 micrometers. The LPE-deposited bubble layer is then topped with discrete metallic layers in SiO_2 dielectric. The Office cited the variation in LPE Bubble thickness for the proposition that Brown et al. would have made it obvious to vary the thickness of the deposited material within each region of the array. According to applicants' claimed method, the components are delivered to "predefined ***discrete*** regions" on the array. The LPE bubble

layer is part of the substrate and is deposited to cover the entire surface of the functional chip and the individual circuit patterns are built upon it in pre-defined region. That is, the LPE bubble layer is not deposited on a "predefined ***discrete*** region." Rather, the bubble layer is deposited continuously across the entire substrate. The ordinarily skilled person would have also found no reason to modify the method of Brown et al. since this reference is, like all of the other references cited, not directed to applying combinatorial techniques for the preparation of at least ten different inorganic materials.

Finally, Jubb et al. disclose a method for depositing multilayer stacks of Permalloy and alumina for determining coercivity and structure of such multilayers. In one respect, the structure contained 400 angstrom thick Permalloy layers, with a 20 to 500 Angstrom alumina layer deposited between each Permalloy layer. In another respect, the structure contained 400 angstrom thick Permalloy layers, with a 100 to 1000 Angstrom alumina layer deposited between each Permalloy layer. Jubb et al. do not disclose that these layers are deposited on a "predefined ***discrete*** region." Rather, the Permalloy-alumina sandwiches are deposited continuously across the entire substrate. The ordinarily skilled person would have also found no reason to modify the method of Jubb et al. since this reference is, like all of the other references cited, not directed to applying combinatorial techniques for the preparation of at least ten different inorganic materials.

Inasmuch as none of the references disclose methods directed to applying combinatorial techniques to preparing at least ten different inorganic materials, the ordinarily skilled person would not have found any reason to modify the methods disclosed therein to arrive at a method which requires varying the composition, concentration, or thickness of the delivered

first or second components between respective regions to a degree sufficient to form ten or more different inorganic materials on ten or more predefined discrete regions of a rigid substrate. In view thereof, the methods as defined by the claims are non-obvious over the cited references, and applicants respectfully request that the rejections be withdrawn.

CONCLUSION

In view of the foregoing, applicants respectfully request reconsideration and allowance of the pending claims. The Commissioner is hereby authorized to charge any deficiency or credit overpayment of any required fee associated with this response to Deposit Account No. 19-1345.

Respectfully submitted,

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